

Open ocean and storms: Perspectives from NSA and OLI during the unusual 2017 autumn on the North Slope

Christopher J. Cox

Thanks to Bob Stone, David Douglas, Gijs de Boer and Diane Stanitski



October 2013



January 2018

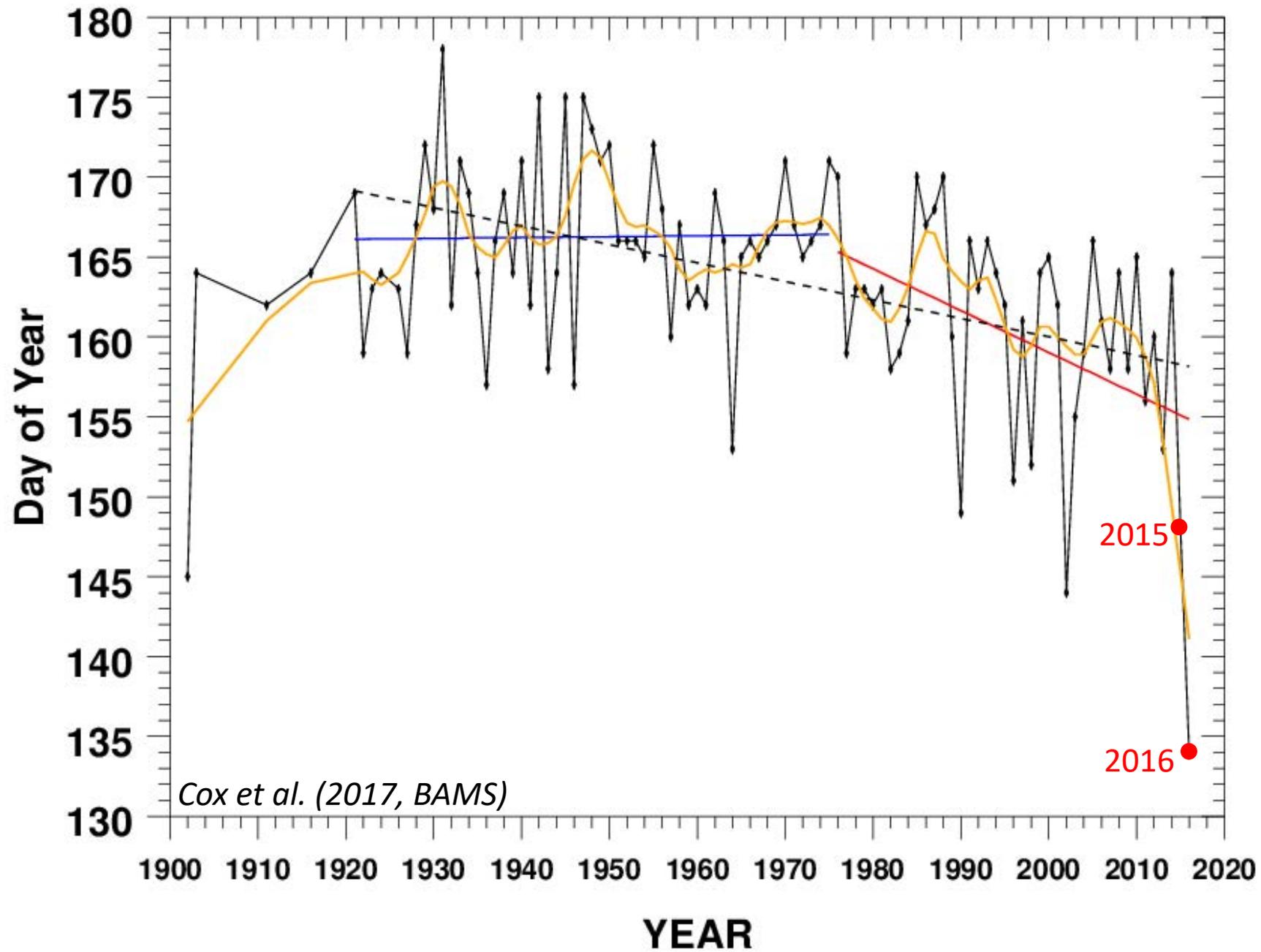
Perspectives from NSA and OLI during the 2017 spring transition season

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Date of snowmelt at Barrow, 1901-2016

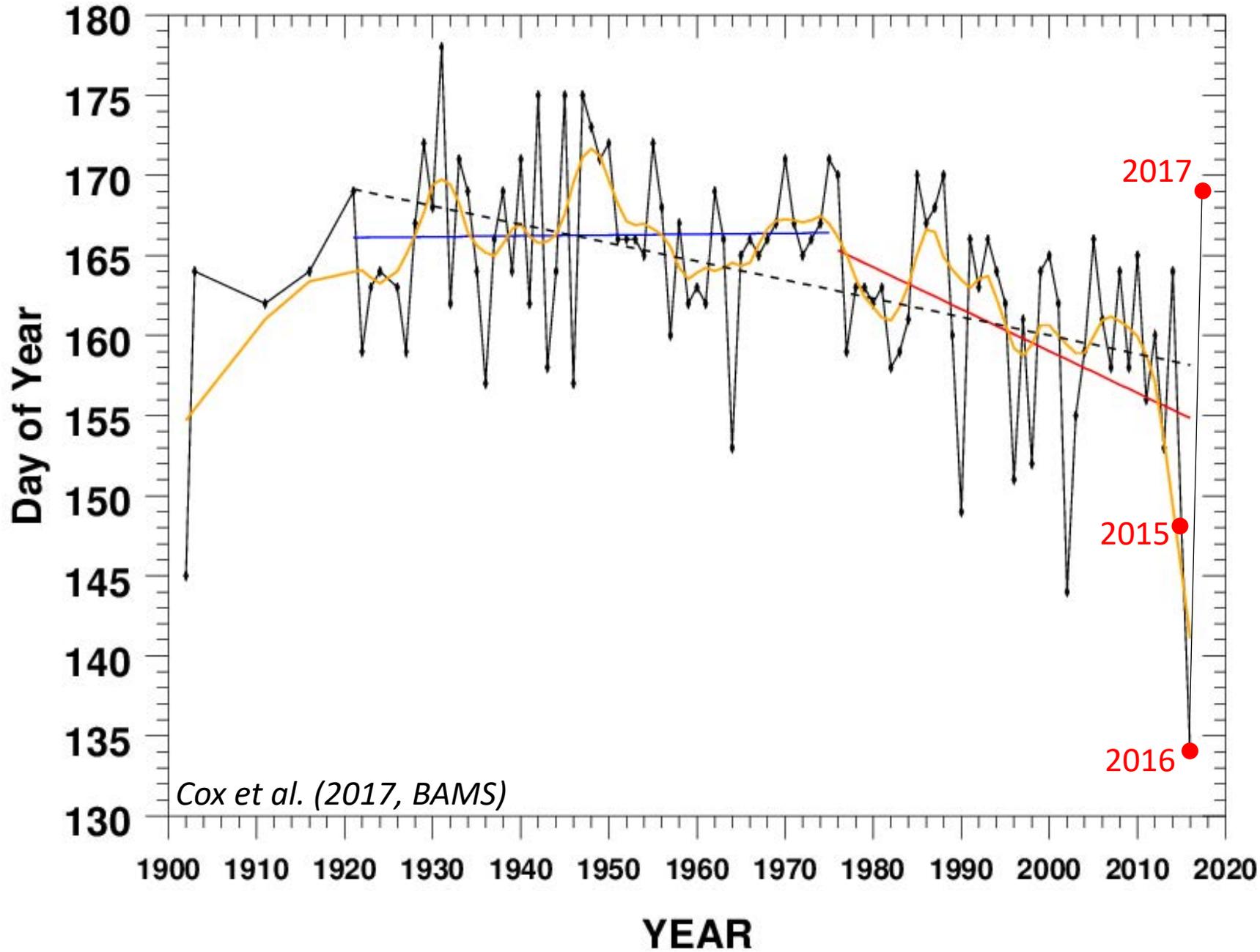


2015: 4th earliest on record

2016: 1st earliest on record

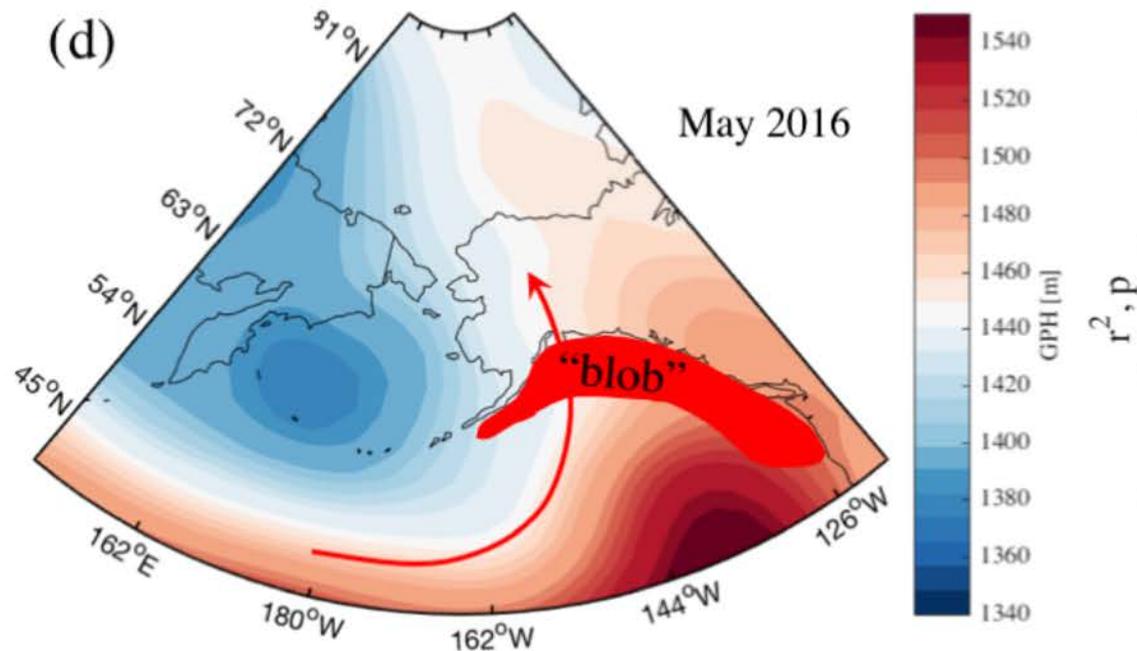
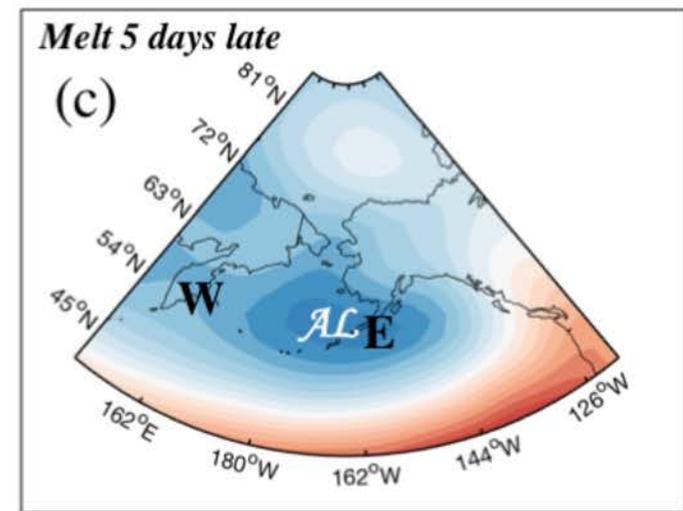
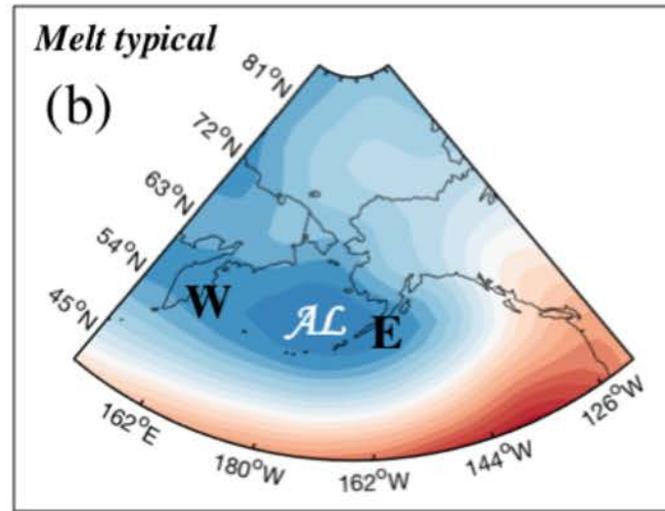
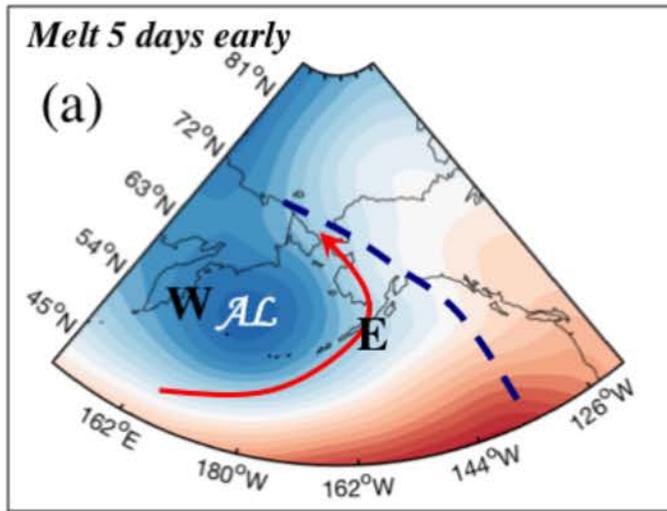
Cox et al. (2017, BAMS)

Date of snowmelt at Barrow, 1901-2016



Cox et al. (2017, BAMS)

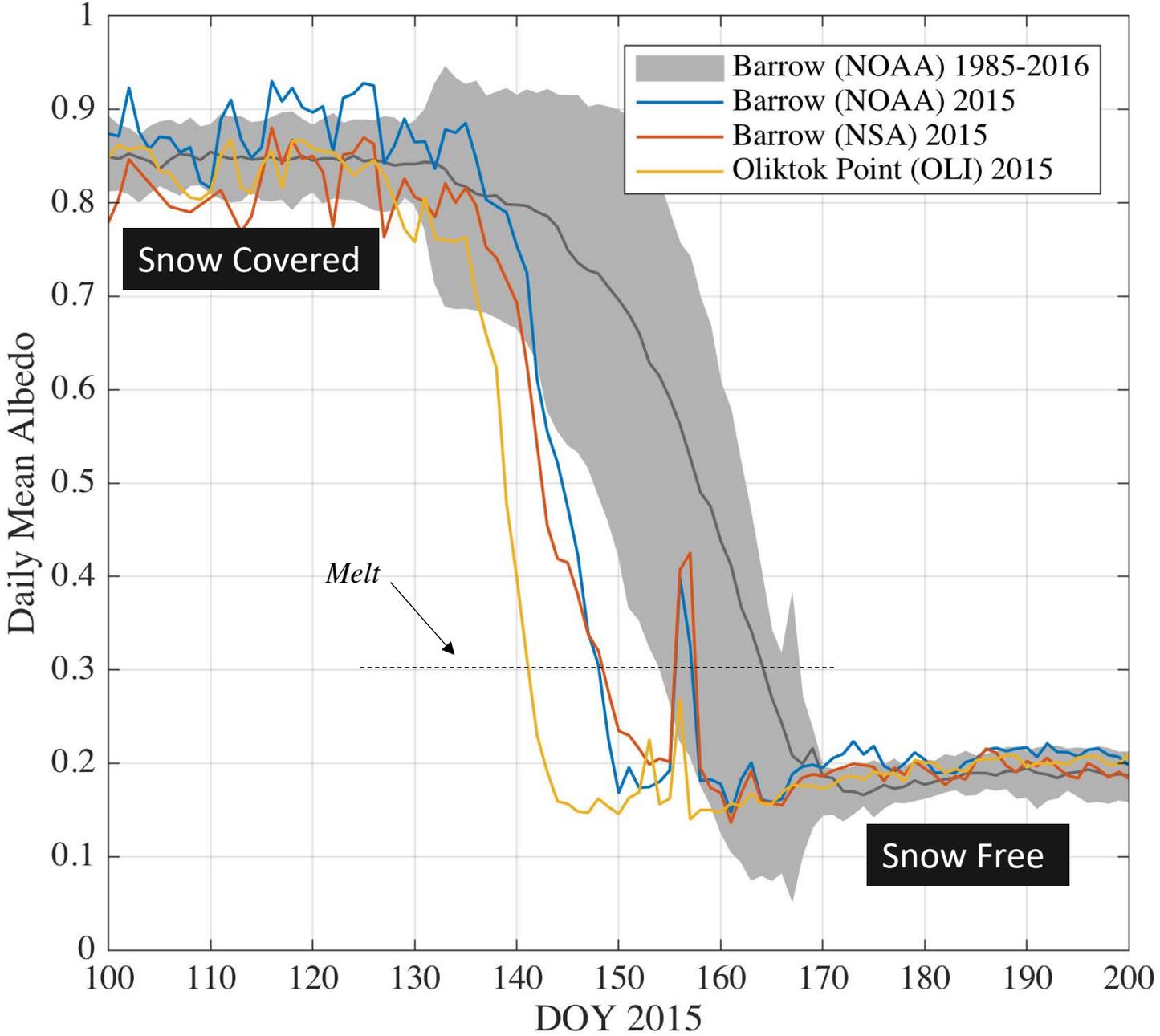
2015: 4th earliest on record
2016: 1st earliest on record
2017: latest since 1988



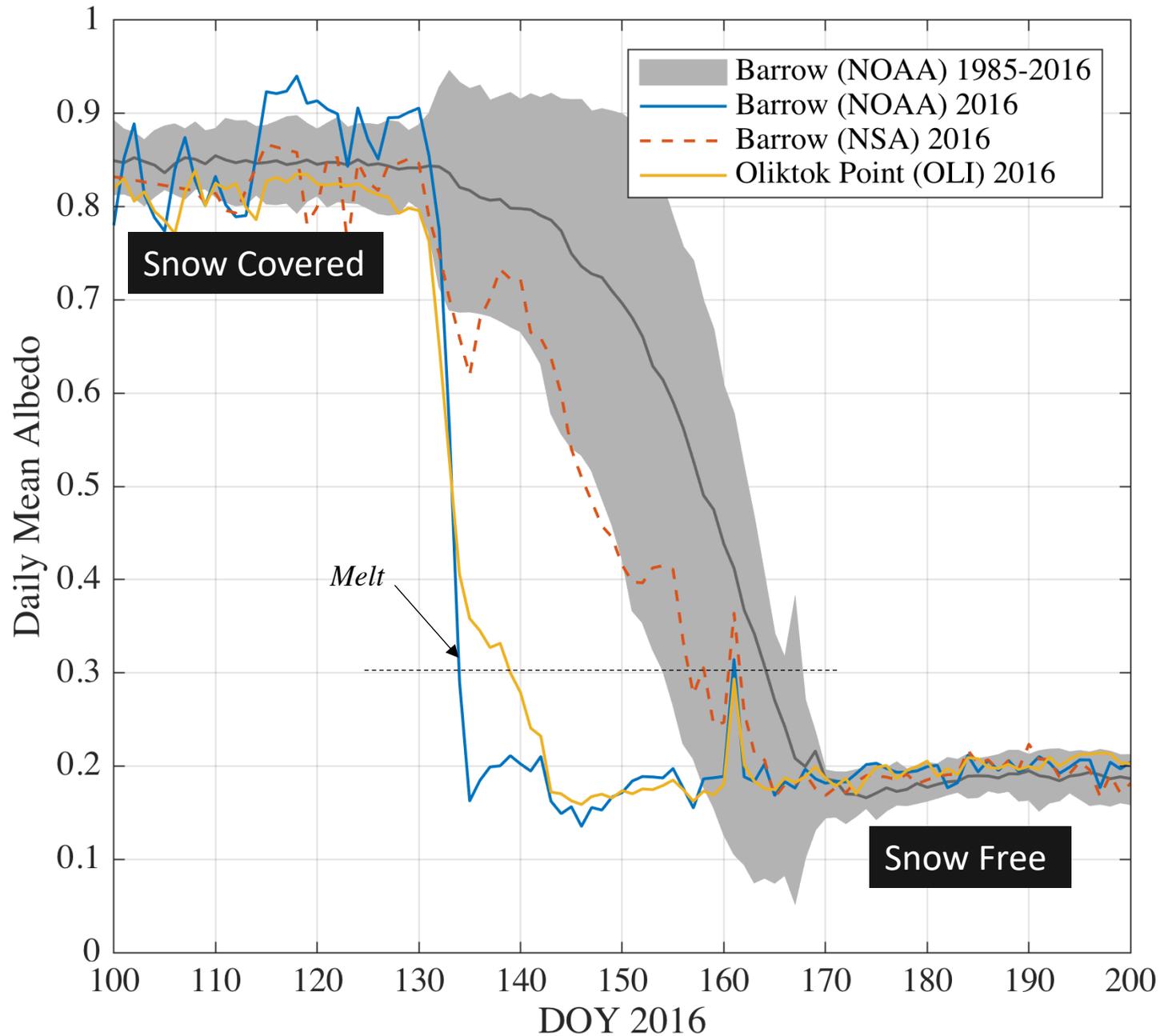
- When Barrow melt is early, Aleutian Low is positioned to the west
- For average and late years the AL is central and for late years the Beaufort High drivers easterlies over the North Slope
- 2015 (not shown), 2016 and 2017 (not shown) were consistent with this picture

Cox et al. (2017, BAMS)

Spring 2015



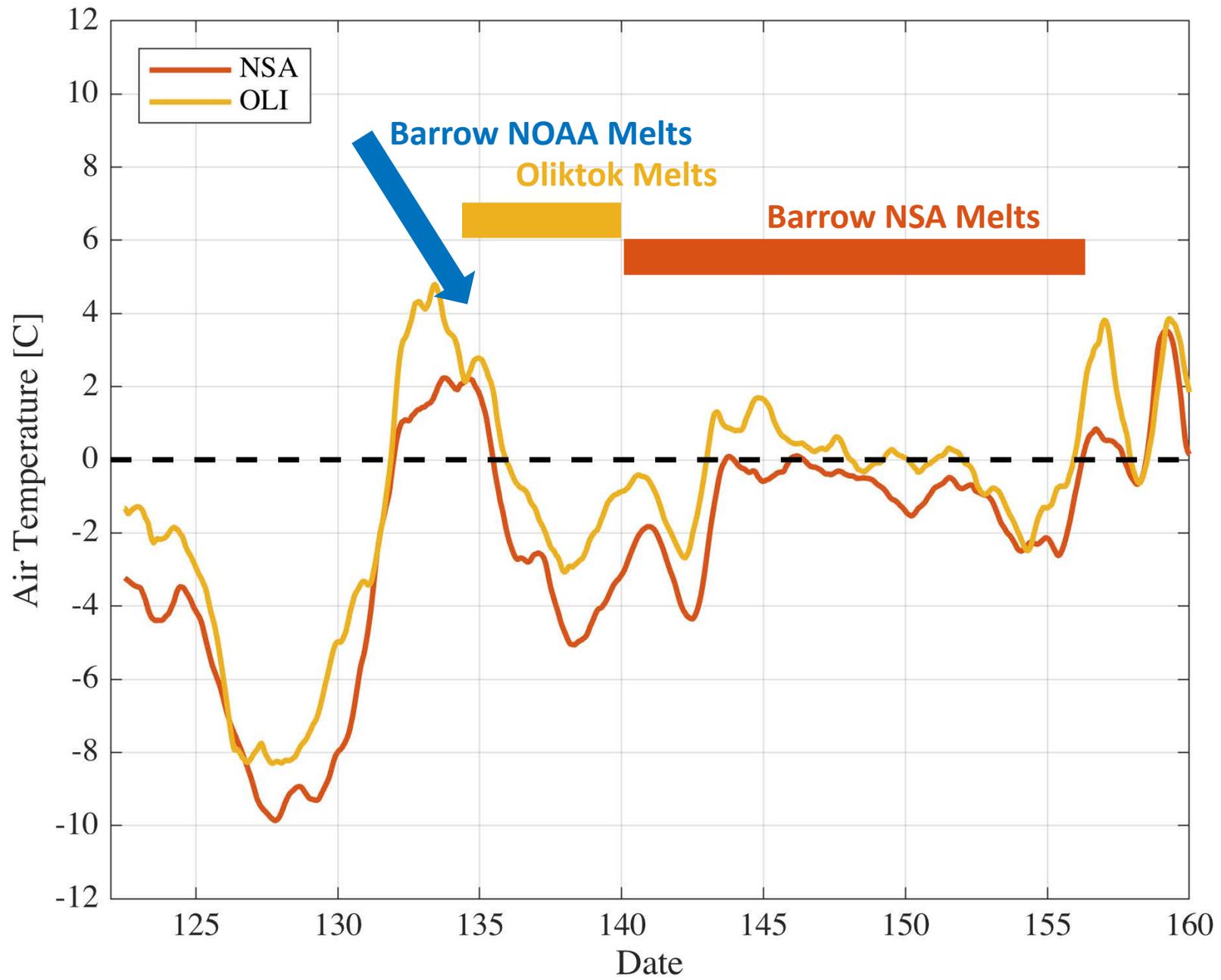
- 2015 was early at both Barrow and Oliktok Pt.
- No climatology for OLI, but OLI was also ~1 week earlier than Barrow in 2014 (not shown).



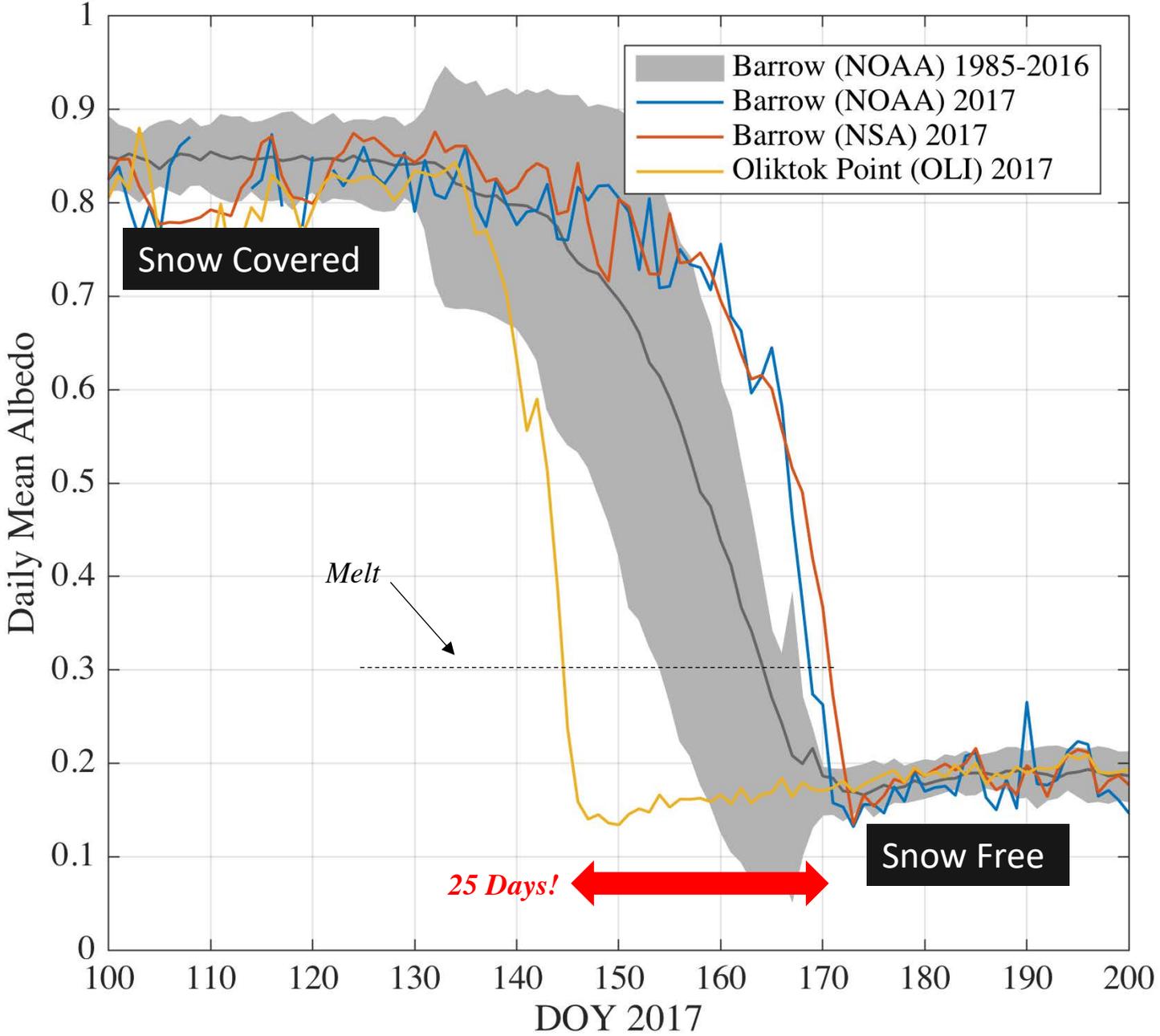
Spring 2016

- 2016 was early at both Barrow and Oliktok Pt.
- We believe NSA was not representative in 2016 because of the drift (e.g., described by Dong et al. 2010).

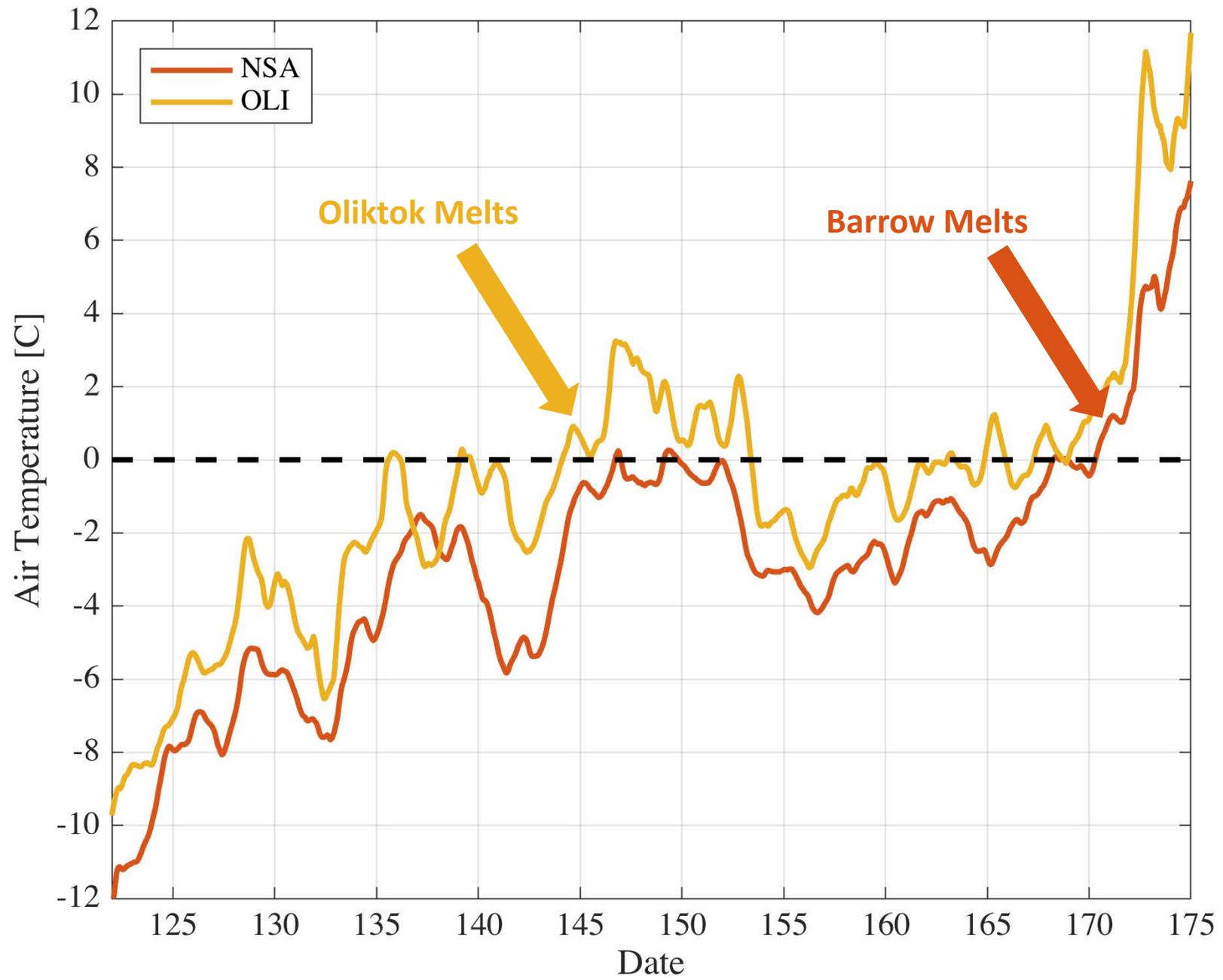




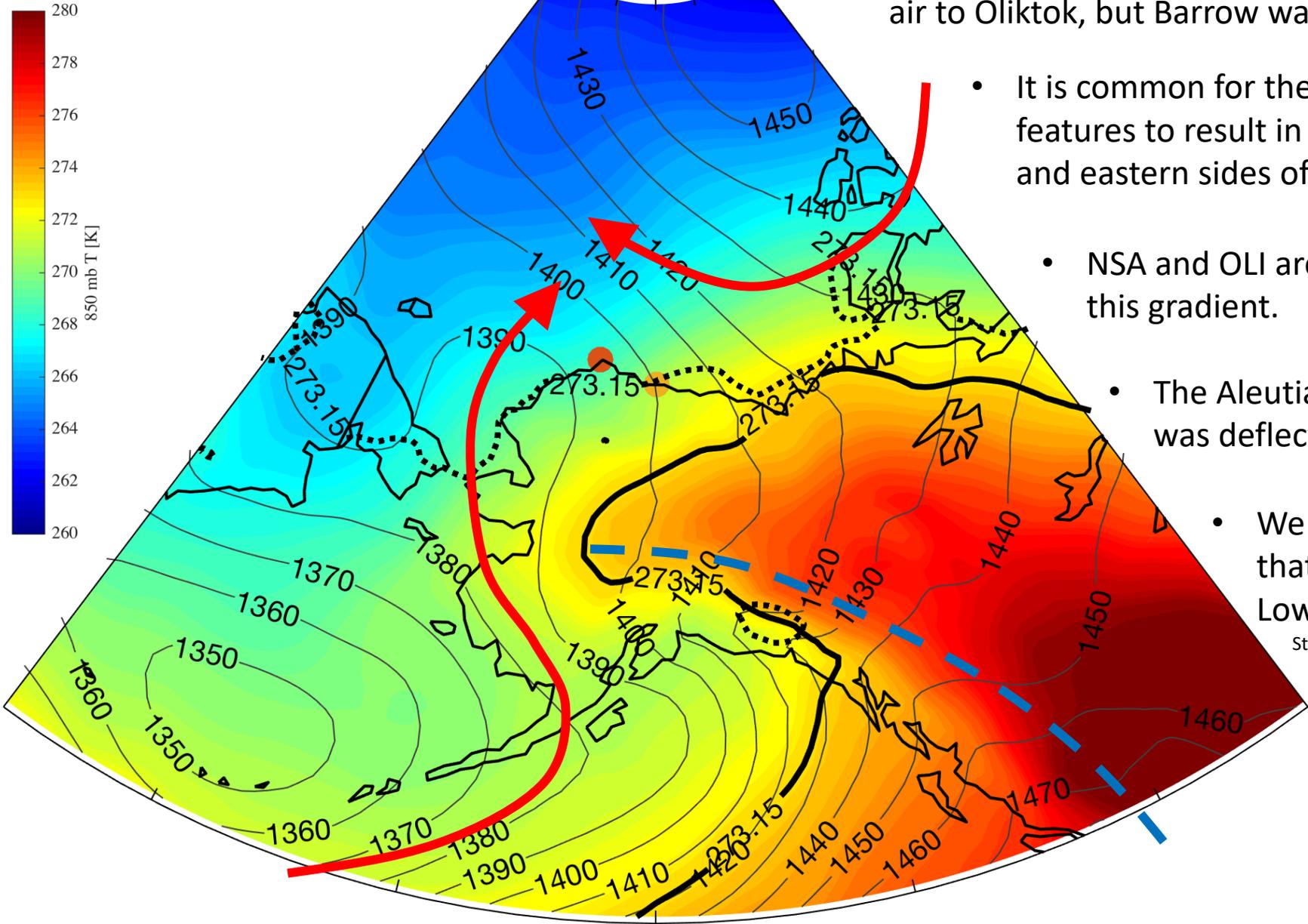
Spring 2017



- 2017 shows agreement at both Barrow stations.
- ...but Oliktok was still quite early
- Why????



May 2017



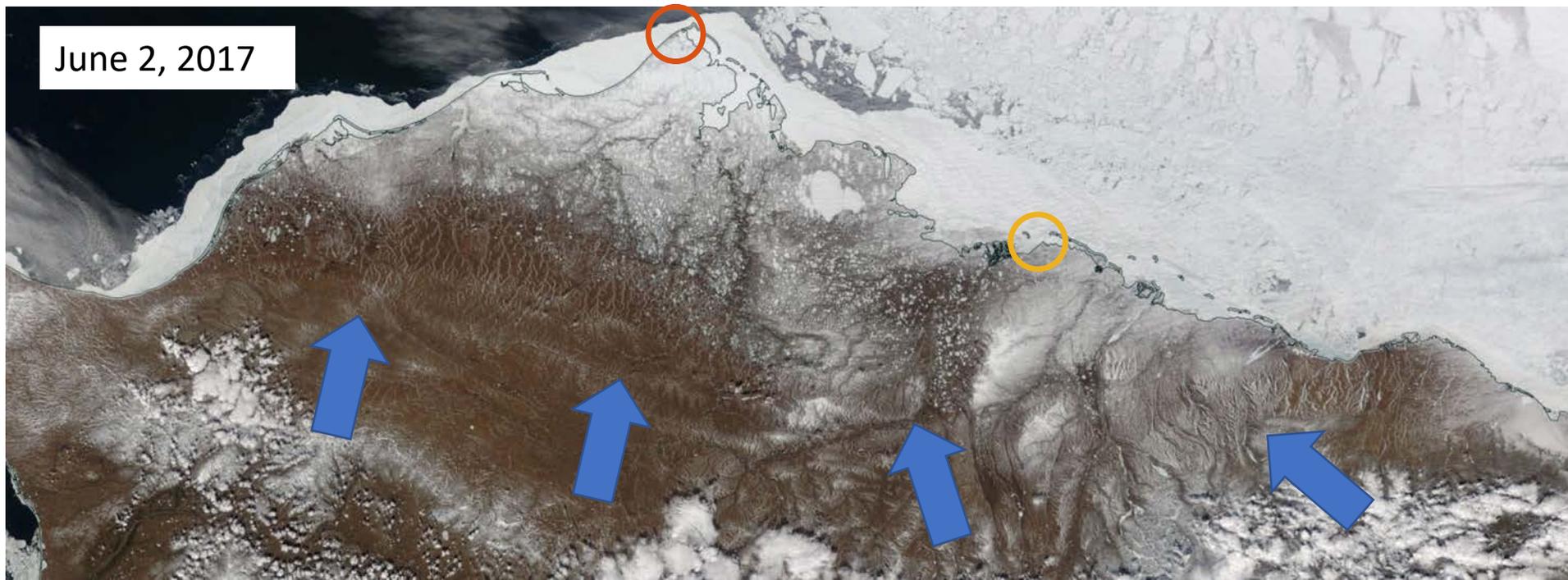
- The extent of the high pressure ridge brought warm air to Oliktok, but Barrow was less influenced.
- It is common for the juxtaposition of these large-scale features to result in different conditions on the western and eastern sides of the North Slope.
- NSA and OLI are well-positioned to observe this gradient.
- The Aleutian Low advected air northward, but it was deflected to the west by the Beaufort High.
- We are working on developing an index that captures this variability: the Aleutian Low Beaufort Sea Anticyclone (ALBSA)

Stone et al. (2002), Cox et al. (2017)

May 20, 2016



June 2, 2017



Summary

- Recent years have shown large interannual variability in the timing of snowmelt on the North Slope
- The snowmelt anomalies are consistent with the juxtaposition of the Aleutian Low and the Beaufort Sea High
- In 2017, a high pressure ridge east of the Aleutian Low was a key factor in supporting the observed early melt at Oliktok compared to the late melt at Barrow
- NSA and OLI are well-positioned to better understand how the transition seasons progress on the eastern and western sides of the North Slope